NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

HUMAN PERFORMANCE

Group Chairman's Factual Report

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ERRATA 1

(2 Pages)

Note: Deletions are shown as strikethrough text and additions are shown as underlined text throughout this document.

Human Performance Factual, page 6, table 3, first column listing dates should be revised as follows (inserted underlined numbers):

Table 3. The FO's self-reported sleep.

Date	Went to Bed	Woke Up	Sleep Opportunity
July 3-4	0200 to 0300	0930 to 1000	6.5 to 8 hours
July 4-5	0200 to 0300	0930 to 1000	6.5 to 8 hours
July 5-6	0200	1130	9.5 hours
July 6 (Flight)	1908	2108	2 hours
July 7 (Flight)*	0223	0243	20 minutes

*Note: Times are shown in Korea time, based on a 24-hour clock. Although the accident occurred on July 6 in San Francisco, some of the pilot's last sleep period occurred on July 7 in Korea Time.

Human Performance Factual Addendum 2, page 7, table titled "Results for the second crew", note at the bottom of the table should be revised to refer to footnote 6 instead of footnote 7, so it reads as follows:

† During run 9 a low airspeed excursion (more than 5 knots below approach speed) occurred between about 900 and 550 feet MSL (see footnote ~~7~~ 6).

Human Performance Factual Addendum 2, page 4, first paragraph, should be revised as follows.

Test conditions ~~were defined as follows~~ are listed in the table below. Some of the conditions included artificial restrictions on the pilots' ability to use the speedbrakes and/or manually override the throttles. These restrictions were imposed to evaluate the efficacy of different techniques for stabilizing an approach.

Human Performance Factual Addendum 2, page 9, footnote 6 should be revised to read as follows:

When the second crew was utilizing VNAV and following the Flight Director (FD) pitch commands in VNAV SPD mode during run 9 (condition 1.8b), airspeed decreased 7 knots below approach speed. Notes about that run that were taken that day by the PF (the FAA test pilot) stated: "VNAV right away (got VNAV SPD), speed went to V_{ref} – 1 knot, 'Didn't like it'. Confused about why speed low (thought it was AT not working right). Lost SA for data collection while focusing on speed. Real world: would've gone around or at least manually intervened on throttle." When queried by email about this event a few days later he stated, "I watched the speed all the way down so I 'noticed it low' when it went through V_{ref} + 5. I let it go to watch what it would do. I was surprised by the fact that VNAV SPD would let the speed deteriorate to Vref -1 (also known as V_{target} -6, or outside the criteria). Central to this discussion is the understanding that I was closely tracking the flight director commands, which I was." He also stated, "…my conclusion is, if you're above the path and fast (i.e. "high and fast"), don't try and fix the problem with VNAV...many reasons for that conclusion, including: induces potential for automation confusion and (as evidenced in this particular condition) it doesn't do it particularly well."~~The PF stated afterward that he had followed the FD bars precisely. He speculated that the FD had commanded a slow speed due to idle thrust state (maximizing rate of descent to correct to the glidepath) in combination with a conflict between VNAV SPD mode's algorithm to hold speed and anticipate a future correction to stabilize on the VNAV glidepath.~~